

# **Air Toxics Workgroup**

## **“TAC List” Discussion Paper — DRAFT**

### **August 20, 2013 UPDATE**

#### **ORR (2011) Report Recommendation A-1(6):**

R 336.1225 should be amended and specifically include the following:  
Limit the number of air toxics to the federal HAPs list.

#### **ATW Initial Discussion**

Discussion of the “TAC list” issue at the 3/5/13 ATW meeting indicated that the “status quo” is characterized by some ATW members as burdensome and more extensive than other Region 5 state’s programs. However, there are also reservations about the sufficiency of the HAPs list. And if the DEQ were to adopt a defined list of TACs for R225 applicability, then staff asked about a mechanism to ensure public health protection if health concerns are posed by the proposed emission of an unlisted compound. ATW members voted, using the “gradient of agreement” tool, on three options: 1. HAPs only; 2. HAPs plus, including a caveat to add other compounds; and, 3. maintaining the status quo. Although there were varied levels of acceptability for each option, the voting was relatively polarized for options 1 and 3, and option 2 was relatively closer to consensus. While the discussion and the voting at that point should not be mistaken for a final recommendation or decision, the feedback was sufficient to prompt DEQ to explore further the potential ways that a regulatory system based on a defined TAC list could be developed.

#### **Goal Statement and Guiding Concepts**

The following **goal statement** was proposed, for purposes of consideration and discussion, and was accepted by the ATW:

*The TAC list includes the federal HAPs list and other air toxics that may be reasonably anticipated to occur in NSR permitted air emissions, and which warrant the evaluation of ambient air impacts in PTI applications in order to help ensure public health and environmental protection while promoting regulatory certainty and efficiency.*

The following set of “**guiding concepts**” for developing an “option 2” approach was provided for discussion purposes:

1. The TAC list should include the HAPs list, and should additionally include the air toxics that may be reasonably anticipated to occur in emissions from facilities requiring a Permit to Install (PTI), minus those substances that have relatively low toxicity. The regulated community would prefer an approach that is focused on the more relevant substances, that is less burdensome and provides greater certainty.

2. The DEQ would have the authority to add to the list or remove substances from the list through the rulemaking process.
3. Rule 203(1)(c) should continue to require PTI applicants to describe the “quantity of **all air contaminants** that are reasonably anticipated due to the operation of the proposed process equipment.” However, for unlisted air toxics (i.e., non-TACs), the current language in Rule 203(1)(h) would not be interpreted to be applicable; i.e., the applicant would not be required to provide in the PTI application, “Data demonstrating that the emissions from the process will not have an unacceptable air quality impact in relation to all federal, state, and local air quality standards.” So, for non-TACs, the permit applicant would need to identify the emission rates but would not be required to model the ambient air impacts or compare the impacts to screening levels or other health protective benchmarks.
4. The DEQ rules should provide the DEQ authority to evaluate the ambient air impacts and potential health concerns of non-TACs in a PTI application, and to impose restrictions on their emissions as necessary to ensure public health protection. Section 324.5512 of NREPA authorizes the department to promulgate rules for controlling or prohibiting air pollution, and to deny or revoke a permit to operate a source, process, or process equipment that **would adversely affect human health** or other conditions important to the life of the community. [The Natural Resources and Environmental Protection Act (NREPA) Act 451 of the Public Acts of 1994, Part 55 Air Pollution Control].
5. For non-TACs, a modeled maximum ambient air impact exceeding a health-protective benchmark, such as a screening level (SL) as currently derived by the DEQ, may or may not in itself provide sufficient weight of evidence to support DEQ action to ensure public health protection under #4 above. The DEQ may additionally consider relevant scientific and case-by-case information (as done currently under Rule 226(d) and Rule 228).

### **Potential Approaches to List Development**

In 2010, AQD conducted a survey of State’s air toxics programs to gather basic information on the scope of their programs, including the list of air toxics regulated. The survey found that 29 of the 50 states regulate air toxics in permit reviews, based on ambient air impact estimates and public health protective benchmarks. Of the 21 states that do not routinely perform air toxics risk assessment in NSR, many (if not all) have a “backstop” or “safety net” provision for case-specific risk assessment. Of the six states in EPA Region 5, four states routinely evaluate air toxics ambient air impacts for public health acceptability. Illinois generally does not (but could in exceptional cases). Indiana performs such evaluations only in a limited number of cases, not “routinely.” Complete information was not collected on what list of air toxics are included for all states, but the gathered information did indicate that program scope varied widely. The state’s approach for establishing the regulated air toxics may be generally grouped into five categories, as listed in **Table 1** below.

**Table 1. State's approaches to the development of lists of regulated air toxics.**

<b>Air toxics included in NSR health risk assessment</b>	<b>Example states</b>	<b># states</b>
HAPs only	CT; HA; VA	3
HAPs plus additional air toxics of concern	KY (HAPs+112r list); LA; NM (HAPs+OELs); NY (HAPs+112r list); NC; ND; RI; VT; WV (HAPs+OELs)	10
All air toxics with OELs	AL	1
State-specific list	OH; WI; CA; ID; MA; NH; SC	7
No discrete list; virtually any may be included	MI; MN; DE; GA; MD; NJ; OK; TX	9

Conceptually, there are several potential approaches to constructing a R225 TAC list, including the following:

- 1. Adopt a list developed by another state / states.**
- 2. Develop a “list of lists.”**
- 3. List those chemicals meeting listing criteria based on health hazards, potency, persistence and bioaccumulation.**
- 4. Develop a list based on the HAPs and the current list of TACs with SLs, with exclusion criteria.**

The tendency for air toxics to pose a public health concern is generally a function of the potency, the exposure potential (which depends on the quantity and duration of the emission, the dispersion, and background exposures), and the presence and susceptibility of the public to the exposure. A list of regulated air toxics that is *unlimited* may be a relatively more reliable approach to address all potential concerns; any approach to developing a defined list of regulated air toxics may potentially be less reliable. For example, a substance with relatively low toxicity may be unlisted, however, a combination of high emissions, poor dispersion, and the presence of an exposed public, can pose public health concerns even if the toxicity or potency is relatively low. A “backstop” plan for detecting and addressing such cases is important, and is discussed elsewhere in this paper. Having noted this general limitation of any defined list, the following is a brief description of the apparent strengths and weaknesses/limitations of the four general approaches listed above, for discussion purposes.

**1. Adopt a list developed by another state / states.**

The positives of this option include convenience, and consistency (with the chosen State(s), but not with others). The concern is that the available lists in Region 5 may not be regarded by the DEQ, ATW, and/or the public, as fully appropriate for Michigan. The Ohio EPA list (303 compounds or classes) is based on the HAPs list plus substances passing several inclusion and exclusion criteria. Their rationale for applying exclusion criteria contains a considerable number of professional judgments. Some of these criteria may be regarded by some as having a questionable basis; environmental groups have strongly objected and have brought a lawsuit against Ohio EPA over the list and the criteria used to develop the list. The Minnesota MPCA has an unlimited list of regulated air toxics. The Wisconsin DNR's list was derived in 2004 based on certain

inclusion and exclusion criteria, and consists of 535 substances (26 HAPs are not included). Of course, lists from states outside of EPA R5 may also be considered. There is no consistency in the state's lists or in the approaches used to derive the lists. It would be arguable to debate whose list is more appropriate for Michigan.

## **2. Develop a “list of lists.”**

This approach was recommended by the Michigan Air Toxics Policy Committee (1989) as a way to focus the required environmental acceptability assessments (with case-by-case assessment of other air toxics of concern at a specific site). They recommended a list of approximately 1200 substances, consisting of the substances with ACGIH or NIOSH OELs, the Michigan Critical Materials Register, the NTP and IARC lists of carcinogens, and the chemicals listed in the IJC's Great Lakes Water Quality Board 1987 Report on Great Lakes Water Quality. As noted in Table 1 above, some states have used the EPA's 112(r) chemical list for emergency preparedness (which consists of 77 acutely toxic chemicals, and 63 flammable gases and volatile flammable liquids). Another relevant list available today is the EPA's Toxics Release Inventory (TRI) list.

The strengths of this approach are the relative ease of compiling a list of lists, and, the contributing lists would presumably have some environmental relevance. The limitations of this approach are that many listed substances may be irrelevant to PTI air emissions in Michigan, and, many of the substances on lists such as the TRI may have inadequate data for SL development. Also, this approach can result in a very long list, which may be undesirable to the regulated community (guiding concept #1 above).

## **3. List those chemicals meeting listing criteria based on health hazards, potency, persistence and bioaccumulation.**

The strength of this approach is that the scientific defensibility may be relatively strong. The limitations of this approach are that it is a relatively labor intensive and time consuming initiative, the appropriate criteria may be difficult to establish, and the resulting list may not be the most relevant to the PTI program. Also, this approach (a version of which was implemented by Ohio EPA) may rely on multiple judgments for inclusion or exclusion that may be contested. A key element would be to establish well-reasoned, non-arbitrary inclusion and exclusion criteria, preferably derived by a consensus approach among multiple stakeholders.

## **4. Develop a TAC list based on the HAPs and the current MDEQ list of TACs with SLs, with exclusion criteria.**

The strengths of this approach are relative efficiency of list development, the focus on air toxics that are relevant to PTI applications in Michigan, and the inclusion of those substances that have already been found to have sufficient toxicity data for SL development. As with #3 above, a key element would be to derive well-reasoned, non-arbitrary criteria, but in this case, those would be more limited since they would only be exclusion criteria (i.e., criteria for not including certain substances that currently have SLs). The limitation of this approach is that the selection of the exclusion criteria may be debatable.

Further rationale for approach #4: The initial universe of substances for assessment is the current SL list of **1202 substances** (as of May, 2013). This list represents MDEQ's 21+ years of experience in evaluating air toxics in the New Source Review permitting program, under an open-ended TAC definition (excluding only a short list of exempted substances; currently 41). Over the last 21 years (since 1992), screening levels have been derived for TACs (under the open-ended definition) if they appeared in proposed emission characterizations for all categories of facilities (thermal, chemical, or general manufacturing). Data-poor chemicals were addressed relatively inclusively in the MDEQ program, i.e., SL derivation methods include the use of minimal data such as subchronic animal studies, LD50s, and LC50s. This list also includes 289 substances with inadequate toxicity data for SL derivation, which were assigned the default ITSL of 0.1 ug/m<sup>3</sup> (annual AT). Rather than propose the inclusion of all 1200+ substances on the future TAC list, some exclusion criteria may be reasonable in the interest of developing a shorter list that is more focused on the more relevant substances and is less burdensome on the regulated community (guiding concept #1).

### **Proposal for the TAC List**

It was proposed that the MDEQ follow approach #4 above, to develop a defined TAC list including the following:

1. Most EPA HAPs should be included, including all individual chemicals that EPA includes as members of HAP listed groups (e.g., metal compounds). For clarity, the individual chemical members of the HAP groups of polycyclic organic matter (POM) and glycol ethers should be listed individually and only if they meet the other qualifying criteria (based on the ITSL or carcinogenicity). The HAPs list includes many air toxics with well documented toxicity and with the potential for public exposure, based on air emissions data and/or ambient air monitoring data. The HAPs list is the focus of EPA's air toxics data collection and regulatory actions under the Clean Air Act. Ohio EPA adopted all HAPs into their Toxic Air Pollutant list. However, it may be noted that some of the HAPs have relatively limited toxicity datasets, and some of the HAPs have not been identified and addressed in Permit to Install applications. For some HAPs, it may not be reasonable to anticipate that they would appear in future PTI applications. Reasons to include all HAPs in a TAC list are: for simplicity; for consistency with EPA; and, for better clarity in communicating the basis for the list with the regulated community and other groups. Reasons to not include some HAPs in the TAC list are: to better focus on the air toxics most relevant to PTI applications; and, many HAPs do not have SLs and therefore may never have been identified in a PTI application. In some cases, DEQ has evaluated air toxics in PTI applications and not established a SL, but rather notified permits staff that the predicted ambient air impact is acceptable, in cases where the impact was very low and the toxicologist did not feel it was appropriate to establish a data-derived or default SL. Therefore, for the **Table 2** list of HAPs without SLs, the Toxics Unit files were reviewed to determine if the substance had been evaluated for a PTI application (**Table 2** has a column for "File Review Comments"). It is tentatively proposed that the potential TAC list exclude HAPs that do not have a SL and have not been encountered in a PTI application.

2. All carcinogens would be included (i.e., all compounds with a current IRSL, or, meeting the current rules' definition of a carcinogen (e.g., asphalt fumes)). See also the discussion of the carcinogenic PAHs in **Table 5**.

3. All substances with ITSLs at or below a cutoff value would be included; substances with only ITSLs that are above the cutoff values would be excluded (see discussion below).

4. It may be considered to exclude all substances with an ITSL of  $0.1 \text{ ug/m}^3$  (annual averaging time) based on the default value and a lack of chemical-specific data sufficient for SL development. That would include 287 chemicals currently on the SL list. This approach is consistent with Guiding Concepts #1 described earlier. This approach would also be consistent with the other EPA R5 State air toxics programs. It may be noted that Texas TCEQ utilizes a default effect screening level (ESL) of  $2 \text{ ug/m}^3$  (1 hour averaging time) when data are lacking for ESL derivation. That default ESL is similar to the AQD default ITSL, using the EPA's Screen3 averaging time (AT) conversion factor of 0.08 for converting from 1 hour AT to annual AT ( $2 \text{ ug/m}^3 \text{ (1 hr AT)} \times 0.08 = 0.16 \text{ ug/m}^3 \text{ (annual AT)}$ ).

5. Consistent with the Guiding Concepts described earlier, substances not on the TAC list would be identified in PTI applications, including information on the quantity of emissions (R203(1)(c)), but the applicant would not be required to include further information demonstrating the acceptability of the air quality impacts. MDEQ may still address those substances, with justification, by way of emission limits to protect the public health and/or adding substances to the TAC list via rulemaking.

### **ITSL Cutoff Values**

Criterion #3 above mentions ITSL cutoff values. While initially proposed cutoff values for consideration may be largely arbitrary (e.g., proposing a  $\text{ug/m}^3$  value or a percentile of an ITSL distribution), the final selection of an appropriate and reasonable cutoff is not arbitrarily selected. Careful consideration by staff and the ATW Members of the reasonableness of the approach, the magnitude of the resulting ITSL cutoff values, the resulting chemicals that meet or fail to meet the cutoff values, and the overall adequacy of the TAC list to meet the goal and the guiding concepts, followed by an ATW recommendation, make the approach more reasoned and deliberate.

The selection of a cutoff may take into consideration available and appropriate criteria utilized in other air quality protection activities. For example, for substances that may be anticipated to exist as particulates in air emissions and in ambient air, consider the primary NAAQS for particulate matter ( $150 \text{ ug/m}^3$  (24 hour) for  $\text{PM}_{10}$ , and  $12 \text{ ug/m}^3$  (annual) and  $35 \text{ ug/m}^3$  (24 hour) for  $\text{PM}_{2.5}$ ); also consider that the ACGIH (2012 handbook; Appendix B) recommends TLVs of  $3 \text{ mg/m}^3$  (respirable particles) and  $10 \text{ mg/m}^3$  (inhalable particles) for Particles Not Otherwise Specified (PNOS).

The Wisconsin air toxics regulatory list is based on several qualifying criteria, including exclusion criteria of having an OEL (TLV) of greater than or equal to 100 ppm or 10 mg/m<sup>3</sup>. A TLV of 10 mg/m<sup>3</sup> would be associated with an AQD ITSL of 100 ug/m<sup>3</sup> (8 hr AT) (utilizing an uncertainty factor of 100, as per the air toxics rules).

It may be considered that the EPA has de-listed some HAPs based upon a finding that there are adequate data on the health and environmental effects of these substances to determine that emissions may not reasonably be anticipated to cause adverse human health or environmental effects (**Table 3**).

The establishment of a cutoff may also consider the range of ITSL values thus far derived by DEQ. An assessment of the current SL values, and the selection of a reasonable percentile of the distribution of the current ITSLs, may help distinguish the relatively more toxic substances (in the majority of the distribution) from the relatively lower toxicity substances (in the minority of the distribution). Setting that cutoff may be guided by consideration of the range of current ITSL values. Rather than setting an *a priori* percentile of the distribution as the cutoff point, it was considered informative to describe the distribution (e.g., the 50<sup>th</sup>, 75<sup>th</sup>, 90<sup>th</sup>, 95<sup>th</sup> and 99<sup>th</sup> percentiles). The distributions were determined after excluding from the dataset those substances with an ITSL of 0.1 ug/m<sup>3</sup> (annual AT) based on the default value. These percentiles were first determined for all current ITSLs, without distinction as to HAP or non-HAP status, and without regard to the various averaging times (ATs) associated with the screening levels. For substances with two ITSLs (acute and chronic), only the chronic (lower) ITSL was included in the assessment. The ITSL distributions were also determined for the following subsets: HAPs only; non-HAPs only; annual AT only; 24 AT only; 8 hr AT only; and, 1 hr AT only. The resulting summary statistics for the ITSL group datasets, as of May 2013, that were initially considered by the ATW are presented in **Table 4a**. It should be noted that an August update of the 75<sup>th</sup> percentile values is presented in **Table 4b**.

For discussion purposes, staff initially pursued the potential content of a TAC list that includes the current ITSLs except for those exceeding the 75<sup>th</sup> percentile cutoff point for each specific averaging time, in addition to the other listing criteria previously mentioned (in bold in **Table 4a**). This approach and proposed cutoff points were regarded by staff as reasonably inclusive, while providing a significant reduction in the current SL list (guiding concept #1). Following ATW consideration and discussion at several meetings through the 8<sup>th</sup> meeting on August 1<sup>st</sup>, 2013, the utilization of the 75<sup>th</sup> percentile of the distribution for each ITSL averaging time appeared to gain acceptance by many Members, pending a final Workgroup recommendation. It should be noted that the updated ITSL cutoff values appear in **Table 4b and Table 7** and in the document on the ATW website, "Proposed TAC List, August Update".

### **Authority to Address Unlisted Air Toxics in PTI Applications**

If the current TAC definition were to be changed to some defined list, then a key issue would be the DEQ's authority to address air toxics concerns that may arise for unlisted

air toxics that are proposed for emission in a PTI application. A review of the authority of other state's air agencies, and of other MDEQ divisions, to address unlisted substances, is summarized in **Table 6**. It was proposed for discussion purposes that AQD adopt rule language similar to that of MDEQ-WRD in **Table 6**. Following Workgroup discussion of issue A-1(9) regarding Rule 228, the Workgroup drafted a recommendation to retain Rule 228 with the addition of clarifying language, and a Member proposed that non-TACs could also be addressed by the AQD as appropriate under this authority.

### **ITSLs With 1 Hour Averaging Times**

Upon review of the proposed TAC list and ITSL cutoffs (**Table 4a**), it was noted that the 75<sup>th</sup> %ile cutoff value for the 1 hr AT ITSLs (300 ug/m3) was not as high as for the 8 hr or 24 hr ITSLs. Staff responded that this group presumably has a relatively lower ITSL distribution because it includes a relatively more acutely toxic subset of the substances that have TLV occupational exposure levels. A Member asked staff to evaluate the chemicals with 1 hr AT ITSLs that do not meet the criteria for TAC listing; if they raise concerns, then it may be an option to include them in the TAC list. Staff evaluated this list of 33 chemicals; eight have 1 hr AT ITSLs above the 75<sup>th</sup> %ile value of 300 ug/m3. Of these eight, one (methylene chloride) is a carcinogen and therefore will be on the TAC list. Another (hydrogen chloride) will be on the TAC list because it also has an annual AT ITSL (20 ug/m3) that is below the 75<sup>th</sup> %ile cutoff for the annual AT. Staff do not feel that the remaining six raise particular concerns for being unlisted, therefore, it is proposed to not make an exception to the 75<sup>th</sup> percentile cutoff for these chemicals:

<b>Chemical</b>	<b>CAS #</b>	<b>1 hr AT ITSL (ug/m3)</b>	<b>Other ITSL</b>
Ethylene glycol	107-21-1	1000	
Hexylene glycol	107-41-5	1210	
Methanol	67-56-1	3250	
Isoamyl acetate	123-92-2	5300	2700 ug/m3 (8 hr AT); this is above the 75 <sup>th</sup> %ile.
Trichlorofluoromethane	75-69-4	56200	
Hfc-227ea	431-89-0	5560000	130000 (annual AT); this is above the 75 <sup>th</sup> %ile cutoff.

### **Listing of Chemical Groups**

The Workgroup discussed how the EPA HAPs list contains chemical groups for metals, and also for glycol ethers, cyanide compounds, POM (polycyclic organic matter), etc. The listing of chemical groups gives the impression of a smaller list size. There are 187



HAPs including the chemical groups, but the actual size of the list of specific HAP chemicals is much larger. The inclusion of chemical groups in a regulatory list can enable a regulatory agency to add chemicals to the list (as new members of a listed group) very efficiently, but this diminishes the goal of a list to be clear and as specific as possible. The Workgroup favored the clarity of specific chemical listings rather than the use of some of the groups as in EPA's HAPs list, although it is recognized that this contributes to a longer list than if groups were listed. Therefore, the proposed list includes *specific* PAHs and glycol ether compounds, etc., if they meet the criteria for listing. Regarding metal compounds, staff feels that in some cases these compounds should be listed separately, because toxicity (and the magnitude of the health protective screening level) is dependent on the specific metal compound. However, in other cases, different compounds of the same metal have toxicity that is primarily determined by the metal alone. In these cases, it seems inappropriate to list the metal forms individually, and then apply a footnote directing that their emissions and impacts should be evaluated additively (with adjustment of the MW to the atomic weight of the metal) for comparison to the screening level. Therefore, staff anticipates that some metals may be appropriately listed as a TAC group. The current SL list, and draft proposed TAC list, include some specific metal compounds that may be grouped together in the future, pending further review. For example, an initial review has tentatively identified the following cases where further assessment is warranted:

"Antimony and antimony compounds" may consolidate 5 current listings.

"Cobalt and cobalt compounds" may consolidate 3 current listings.

"Copper and copper compounds" may consolidate 4 current listings.

"Magnesium and magnesium compounds" may consolidate 7 current listings.

"Manganese and manganese compounds" may consolidate 4 current listings.

"Molybdenum water soluble compounds" may consolidate 3 current listings.

"Molybdenum water insoluble compounds" may consolidate 3 current listings.

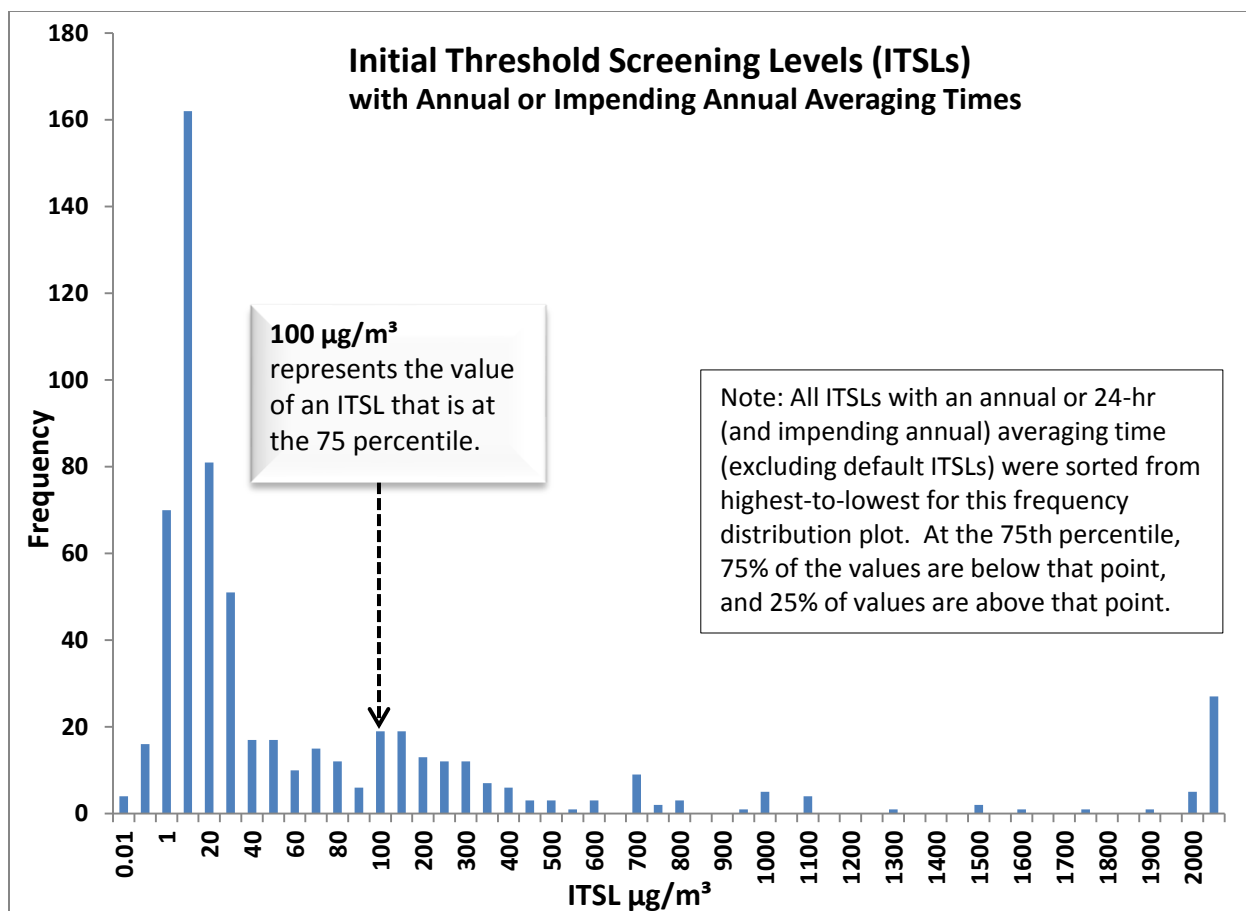
### **Merging of the Current Annual AT ITSLs With the Current RfC- and RfD-Based 24-Hour AT ITSLs That Are Anticipated To Change to Annual AT**

Concurrent with addressing the TAC list issue, the Workgroup explored the ORR Report's Recommendation A-1(7): Make acceptable exposure limits consistent with other nearby states. As a result of that discussion, the Workgroup is recommending that AQD utilize a default annual averaging time (AT) rather than a 24 hour AT for ITSLs that are based on the EPA RfC and RfD methodologies. AQD is agreeable to making that change. Therefore, for those chemicals, the change in AT from 24 hours to annual may be regarded as "impending". However, this issue crosses over to the "TAC List" issue, because the proposed TAC list criteria include ITSL cutoff values set at the 75<sup>th</sup>

percentile level for each AT. Those 75<sup>th</sup> percentile values are statistically determined based on the distribution of all of the non-default ITSLs for each AT. Previous estimates (e.g., the April 2013 statistics in **Table 4A**) of the 75<sup>th</sup> percentiles, TAC list size, and the TAC list of chemicals were based on the *current* ATs and 75<sup>th</sup> percentiles, and did not account for this impending change in ATs. Further, the proposed draft rule language for the TAC list issue will include specific ITSL cutoff values. Therefore, it seems appropriate and necessary to address this impending change in the ATs so that the specific ITSL cutoff values in the draft proposed rules will reflect the AT change. In other words, the ITSL cutoff values for both annual and 24 hour ATs in the proposed draft rules should reflect that impending change. Also, there was a concern that making that change could significantly change the 75<sup>th</sup> percentile cutoff values, and potentially cause a significant change in the number of chemicals proposed for the TAC list.

Staff recognized this issue and completed the evaluation of this AT change after the August 1, 2013 ATW meeting. After all ITSLs with a current 24 hour AT based on the EPA RfC or RfD methodologies are changed to annual AT, only eight chemicals will still have a 24 hour AT ITSL. The characteristics of that group are described in **Table 7**. The previous 75<sup>th</sup> percentile cutoff values and the number of chemicals in the proposed draft TAC list are also presented for comparison in **Table 7**. Although the AT conversion results in a relatively small set of chemicals (n=8) that will have 24 hr AT ITSLs, the ITSLs in that group are well distributed (ranging from 2 ug/m3 to 10000 ug/m3), and the 75<sup>th</sup> %ile cutoff did not change greatly (an increase from 420 to 522 ug/m3).

Based on these findings, it is proposed that the draft TAC list rules utilize the cutoffs that result from the conversion of the ITSL ATs as described above. The effect of merging the two groups (those with current annual AT ITSLs, and those with an impending AT change from 24 hours to annual AT) is an increase in the cutoff from 43 ug/m3 to 100 ug/m3 for the annual AT. The effect of this change is the inclusion of chemicals that currently have annual AT ITSLs that are above the prior annual AT cutoff of 43 ug/m3, but which are at or below the new cutoff of 100 ug/m3. Another effect of this change is the exclusion of chemicals that have current 24 hr AT ITSLs below the prior 24 hr AT cutoff of 420 ug/m3, but above the new annual AT cutoff of 100 ug/m3. The overall net effect of these changes is a small increase in the total list of TACs (a change from 750 to 756 chemicals). This is further described in **Table 7**. The graph below helps to visualize the distribution of the merged annual AT ITSLs, and the 75<sup>th</sup> percentile cutoff value.



### Other Chemical Listing Discussions

In addition to the above criteria, procedures, and discussions, the ATW discussed the listing of two perfluorinated compounds (PFOS, CAS# 1763-23-1; and PFOA, CAS# 335-67-1), crystalline silica (from sources not meeting the current TAC list exemption; CAS# 14808-60-7), carcinogenic PAHs, and asphalt fumes (CAS# 8052-42-4) (see **Table 5**). Also, a Member requested that methyl isocyanate (CAS# 624-83-9) be added to the proposed TAC list due to high toxicity and the potential that it could occur in a future permit application. Although mercury (CAS# 7439-97-6) does not have a SL, the SL list has a footnote indicating that a benchmark for inhalation of elemental mercury (0.3 ug/m<sup>3</sup>) would meet the cutoff criterion; mercury is included in the future TAC list.

### Proposed TAC List and Procedure

The proposed TAC list, based on the above criteria, procedure, and discussions, is **756 chemicals**. This may be anticipated to change somewhat due to the routine updating of chemical risk assessments, the evaluation of “new” air toxics in permit applications, the potential consolidation of some metal compounds, etc. Further statistical information and a spreadsheet showing all *current* TACs, and the basis for chemicals meeting or not meeting the criteria for the *proposed future* TAC list, are available on the ATW website in an August 13, 2013 document, “Proposed TAC List, August 2013”. The

spreadsheet includes a notation for the chemicals that currently have 24 hr AT ITSLS but with an impending change to an annual AT. The spreadsheet reflects the updated 75<sup>th</sup> %ile cutoff values as listed in **Table 4b** and **Table 7**.

**Table 2. HAPs without SLs.**

<b>Chemical and CAS #</b>	<b>Toxics Unit File Review Comments</b>
Acetamide 60-35-5	There is no indication of a review for NSR permitting, therefore, it is proposed to not include it in the TAC list.
2-acetylaminofluorene 53-96-3	There is no indication of a review for NSR permitting, therefore, it is proposed to not include it in the TAC list.
4-aminobiphenyl 92-67-1	There is no indication of a review for NSR permitting, therefore, it is proposed to not include it in the TAC list.
o-anisidine 90-04-0	O-anisidine hydrochloride (134-29-2) has an IRSL. Therefore, include it in the TAC list.
Benzotrichloride (trichlorotoluene) 98-07-7	There is no indication of a review for NSR permitting, therefore, it is proposed to not include it in the TAC list.
Calcium cyanamide 156-62-7	There is no indication of a review for NSR permitting, therefore, it is proposed to not include it in the TAC list.
Captan 133-06-2	There is no indication of a review for NSR permitting, therefore, it is proposed to not include it in the TAC list.
Carbaryl 63-25-2	There is no indication of a review for NSR permitting, therefore, it is proposed to not include it in the TAC list.
Catechol 120-80-9	There is no indication of a review for NSR permitting, therefore, it is proposed to not include it in the TAC list.
Chloramben 133-90-4	There is no indication of a review for NSR permitting, therefore, it is proposed to not include it in the TAC list.
Chlordane 57-74-9	Chlordane (technical) (12789-03-6) has an ITSL and IRSL. Therefore, it is proposed to include it in the TAC list.
Chloroacetic acid 79-11-8	This was evaluated for at least one NSR permit. Therefore, it is proposed to list it as a TAC.
Chlorobenzilate 510-15-6	There is no indication of a review for NSR permitting, therefore, it is proposed to not include it in the TAC list.
Chloromethyl methyl ether 107-30-2	There is no indication of a review for NSR permitting, therefore, it is proposed to not include it in the TAC list.
2,4-D, salts and esters 94-75-7	There is no indication of a review for NSR permitting, therefore, it is proposed to not include it in the TAC list.
DDE 3547-04-4	DDD(TDE; 72-54-8), DDE(p,p'; 72-55-9) and DDT(50-29-3) have IRSLS. Therefore, it is proposed to include it in the TAC list.
Diazomethane 334-88-3	There is no indication of a review for NSR permitting, therefore, it is proposed to not include it in the TAC list.
3,3-dimethoxybenzidine 119-90-4	This was evaluated for at least one NSR permit. Therefore, it is proposed to list it as a TAC.
Dimethyl aminoazobenzene 60-11-7	There is no indication of a review for NSR permitting, therefore, it is proposed to not include it in the TAC list.
3,3'-dimethyl benzidine 119-93-7	There is no indication of a review for NSR permitting, therefore, it is proposed to not include it in the TAC list.
Dimethyl carbamoyl chloride	There is no indication of a review for NSR permitting,

79-44-7	therefore, it is proposed to not include it in the TAC list.
1,1-dimethyl hydrazine 57-14-7	There is no indication of a review for NSR permitting, therefore, it is proposed to not include it in the TAC list.
1,2-diphenylhydrazine 122-66-7	There is no indication of a review for NSR permitting, therefore, it is proposed to not include it in the TAC list.
Ethyl carbamate (Urethane) 51-79-6	This was evaluated for at least one NSR permit. Therefore, it is proposed to list it as a TAC.
Ethylene imine (Aziridine) 151-56-4	This was evaluated for at least one NSR permit. Therefore, it is proposed to list it as a TAC.
Hexamethylphosphoramide 680-31-9	There is no indication of a review for NSR permitting, therefore, it is proposed to not include it in the TAC list.
Hydroquinone 123-31-9	This was evaluated for at least one NSR permit. Therefore, it is proposed to list it as a TAC.
Lindane (all isomers) 58-89-9	There is no indication of a review for NSR permitting, therefore, it is proposed to not include it in the TAC list.
Methoxychlor 72-43-5	There is no indication of a review for NSR permitting, therefore, it is proposed to not include it in the TAC list.
Methyl iodide (Iodomethane) 74-88-4	This was evaluated for at least one NSR permit. Therefore, it is proposed to list it as a TAC.
Methyl isocyanate 624-83-9	There is no indication of a review for NSR permitting, therefore, it is proposed to not include it in the TAC list.
4,4-methylene bis(2-chloroaniline) 101-14-4	There is no indication of a review for NSR permitting, therefore, it is proposed to not include it in the TAC list.
4,4'-methylenedianiline 101-77-9	There is no indication of a review for NSR permitting, therefore, it is proposed to not include it in the TAC list.
4-nitrobiphenyl 92-93-3	There is no indication of a review for NSR permitting, therefore, it is proposed to not include it in the TAC list.
N-Nitrosomorpholine 59-89-2	There is no indication of a review for NSR permitting, therefore, it is proposed to not include it in the TAC list.
Parathion 56-38-2	There is no indication of a review for NSR permitting, therefore, it is proposed to not include it in the TAC list.
p-Phenylenediamine 106-50-3	There is no indication of a review for NSR permitting, therefore, it is proposed to not include it in the TAC list.
Phthalic anhydride 85-44-9	There is no indication of a review for NSR permitting, therefore, it is proposed to not include it in the TAC list.
beta-Propiolactone 57-57-8	There is no indication of a review for NSR permitting, therefore, it is proposed to not include it in the TAC list.
Propoxur (Baygon) 114-26-1	There is no indication of a review for NSR permitting, therefore, it is proposed to not include it in the TAC list.
Quinone (p-benzoquinone) 106-51-4	This was evaluated for at least one NSR permit. Therefore, it is proposed to list it as a TAC.
Styrene oxide 96-09-3	Styrene (also a HAP) has an IRSL. Styrene is metabolized to styrene oxide. Both are reasonably anticipated to be human carcinogens (NTP Report on Carcinogens, 12 <sup>th</sup> Ed.). Therefore, RETAIN on TAC list.

Titanium tetrachloride 7550-45-0	There is no indication of a review for NSR permitting, therefore, it is proposed to not include it in the TAC list.
2,4-toluene diamine 95-80-7	There is no indication of a review for NSR permitting, therefore, it is proposed to not include it in the TAC list.
Trifluralin 1582-09-8	There is no indication of a review for NSR permitting, therefore, it is proposed to not include it in the TAC list.
Lead compounds	Lead is a criteria pollutant; exempted from TAC defn.
Radionuclides (including radon)	A 1994 DEQ policy determination was that there were sufficient regulations by NRC, EPA, and MDCH, such that additional AQD permitting requirements would be unnecessary and duplicative.
Polycyclic organic matter (POM)	The TAC list should include specific compounds, for clarity, if they meet criteria (ITSLs or carcinogenicity).
Glycol ethers	The TAC list should include specific compounds, for clarity, if they meet criteria (ITSLs).

**Table 3. De-listed EPA HAPs.**

<b>Delisted HAP</b>	<b>Date of delisting</b>	<b>AQD ITSL (ug/m<sup>3</sup>; AT) or RfC</b>	<b>comments</b>
Caprolactam	6/18/96	10 ug/m <sup>3</sup> (8 hr AT)	
Surfactant alcohol ethoxylates and their derivatives (SAED) (in glycol ethers HAP category)	8/2/2000	Ethylene glycol ether 2-methoxy-1-propanol (a non-SAED) used as a conservative surrogate to derive an RfC-like benchmark of 200 to 2000 ug/m <sup>3</sup> for SAEDs.	A hypothetical facility emission rate of 105 lbs total SAEDs/year was used in the petition for de-listing, and was relied upon in EPA's review.
Ethylene glycol monobutyl ether (2-butoxyethanol) (in glycol ethers HAP category)	11/29/04	1600 ug/m <sup>3</sup> (24 hr AT)	
Methyl ethyl ketone	12/19/05	5000 ug/m <sup>3</sup> (24 hr AT)	

**Table 4a.** ITSL value distribution (as of April, 2013). All values are in units of  $\mu\text{g}/\text{m}^3$ . (These statistics are based on only the air toxics with data-derived final SLs, i.e., excluding chemicals with only default-based ITSLs).

<b>ITSL group</b>	<b>Mean</b>	<b>50<sup>th</sup> %ile</b>	<b>75<sup>th</sup> %ile</b>	<b>90<sup>th</sup> %ile</b>	<b>95<sup>th</sup> %ile</b>	<b>99<sup>th</sup> %ile</b>
All ITSLs	1375	24	140	1956	5000	23800
HAPs only	626	14.5	100	1000	3088	13572
Non-HAPs only	1547	28	140	2300	5450	42850
Annual AT only	482	14	<b>43</b>	140	300	1363
24 hr AT only	1789	60	<b>420</b>	2600	6000	46600
8 hr AT only	2760	86	<b>2850</b>	6020	16710	30482
1 hr AT only	2741	15	<b>290</b>	1168	3046	44551

**Table 4b.** Updated 75<sup>th</sup> percentile values (as of August, 2013) reflecting the change in averaging time from 24 hours to annual for ITSLs based on the RfC or RfD methodologies. All values are in units of  $\mu\text{g}/\text{m}^3$ . (These statistics are based on only the air toxics with data-derived final SLs, i.e., excluding chemicals with only default-based ITSLs).

<b>Averaging Time</b>	<b>75<sup>th</sup> Percentile of Distribution (<math>\mu\text{g}/\text{m}^3</math>)</b>
1 hr	<b>300</b>
8 hr	<b>2330</b>
24 hr	<b>522</b>
Annual	<b>100</b>



**Table 5. Additional air toxics (n=23) that are not on the TAC SL list, which are proposed to be added to the future TAC list:**

Substance	Comments on why there is no SL, but that listing as a TAC would be appropriate
Crystalline silica (14808-60-7)	Not a HAP. Some sources of crystalline silica are exempt from TAC definition. (AQD has recently set an ITSL at 3 ug/m <sup>3</sup> (annual AT)). Proposed to place it on the TAC list. The current TAC list exemption for certain sources would remain.
Asphalt fumes (8052-42-4)	Not a HAP as a mixture. The fumes contain carcinogens, but there is no IRSL for the mixture due to lack of a key study on the mixture. Based on a 1995 Scientific Advisory Panel recommendation, AQD has regulated the mixture utilizing the EPA RPFs for carcinogenic PAHs (see also below). Proposed to list this mixture as a TAC with an explanatory footnote (only) that would help clarify the regulatory approach.
Carcinogenic PAHs (n=19, in addition to those meeting other listing criteria)	The PAHs are HAPs as “POM.” The EPA’s risk assessment of the carcinogenic PAH group is currently in transition. The 1993 EPA guidance for the group is currently still in use by MDEQ (there are 7 carcinogenic PAHs, including B(a)P and 6 with Relative Potency Factors (RPFs) relative to B(a)P). CalOEHHA regulates 21 carcinogenic PAHs with RPFs. EPA has drafted a new scheme, with 25 carcinogenic PAHs with nonzero RPFs (including B(a)P); they are currently addressing the SAB review comments on that draft ( <a href="http://yosemite.epa.gov/sab/sabproduct.nsf/0/E65D909C98520C1D85257501005E46AE?OpenDocument">http://yosemite.epa.gov/sab/sabproduct.nsf/0/E65D909C98520C1D85257501005E46AE?OpenDocument</a> ). Currently, 16 do <b>not</b> have SLs. <b>Three</b> additional PAHs have evidence of carcinogenicity, have CalOEHHA RPFs, and are not on the current SL list. Therefore, <b>19</b> additional substances for the TAC list are proposed, for this group. (In the 5/13/13 spreadsheet of potential TACs, the basis for listing = “Carc7” (n=7), “EPA Carc” (n=16), or “CAL Carc” (n=3).
Perfluorinated compounds (PFCs): PFOS and PFOA (n=2)	Perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA) are persistent bioaccumulative toxics (PBTs) that have been identified by MDEQ as emerging contaminants of concern. ( <a href="http://www.michigan.gov/deq/0,4561,7-135-3308-266777--,00.html">http://www.michigan.gov/deq/0,4561,7-135-3308-266777--,00.html</a> ). PFCs have recently been detected in Michigan groundwater and in several species of aquatic and terrestrial wildlife. Although the presence of PFCs in air emission sources subject to NSR permitting has not yet been characterized, it is proposed that these two PFCs be listed as TACs. (In the 8/13/13 spreadsheet of potential TACs, the basis for listing = “Emerging”.

**Table 6.** Authority to address unlisted substances.

Agency	Description of authority
MDEQ-Water Resources Division (WRD)	NREPA Part 8 rules regulate surface water discharges of “toxic substances,” which are defined as those included in three lists of substances (several hundred) and, <b>“Any other toxic substances that the department determines are of concern at a specific site.”</b>
MDEQ-Remediation and Redevelopment Division (RRD)	NREPA Part 201 rules define “hazardous substance” as three lists of substances (several hundred), and, <b>“Any substance that the department demonstrates, on a case by case basis, poses an unacceptable risk to the public health, safety, or welfare, or the environment, considering the fate of the material, dose-response, toxicity, or adverse impact on natural resources.”</b>
Ohio EPA - Air	Ohio EPA has a list of 303 chemicals/classes of regulated air toxics. Language in administrative code and in rules gives authority for their Director to evaluate unlisted air toxics (personal communication with Paul Koval, 2/21/13).
Wisconsin DNR - Air	There are 535 listed “hazardous air contaminants” substances/groups; this was established in 2004, based on criteria specified in their code. Authority to address unlisted substances: <b>“Code: NR 445.03 General limitations. No person may cause, allow or permit emissions into the ambient air of any hazardous substance in a quantity or concentration or for a duration that is injurious to human health, plant or animal life unless the purpose of that emission is for the control of plant or animal life. Hazardous substances include but are not limited to the hazardous air contaminants listed in Tables A to C of s. NR 445.07.”</b>
Minnesota PCA - Air	MN does not have a defined list of regulated air toxics. Statute: <b>“The Pollution Control Agency may issue, continue in effect or deny permits, under such conditions as it may prescribe for the prevention of pollution, for the emission of air contaminants...”</b>

**Table 7. The Effects of Converting the 24 Hour AT ITSLs Based on the RfD or RfC Methodologies to Annual AT ITSLs.**

	<b>May 13, 2013 Draft Discussion Paper</b>	<b>Current Discussion Paper</b>	<b>Comments</b>
Number of chemicals with an annual AT ITSL	389	620	The current number reflects the conversion from 24 hr AT to annual AT for all RfC- and RfD-based ITSLs.
Number of chemicals with a 24 hr AT ITSL	239	8	Same as above.
75 <sup>th</sup> %ile cutoff for annual AT (ug/m3)	43	100	The current cutoff is significantly higher than previous, due to the new, larger group of chemicals in the annual AT group.
75 <sup>th</sup> %ile cutoff for 24 hr AT (ug/m3)	420	522	The AT conversion will result in 8 remaining chemicals with a 24 hr AT. Only two of these 8 chemicals (TCE and tetrachloroethylene) have 24 hr AT ITSLs that are above the cutoff of 522 ug/m3; they would be listed as TACs based on carcinogenicity.
<b>Total TACs</b>	<b>750</b>	<b>756</b>	